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ESTIMATES OF SPORT EFFORT AND CATCH AND HARVEST
OF RAINBOW TROUT AND COHO SALMON
IN LAKE CREEK, ALASKA, DURING 1988¹

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ABSTRACT

Roving creel surveys were conducted to estimate effort for and catch and harvest of coho salmon *Oncorhynchus kisutch* and rainbow trout *Oncorhynchus mykiss* in the sport fishery in Lake Creek from 4 August through 11 September 1988. These surveys estimated that 11,117 angler-hours of effort were expended by sport anglers during this period. This effort resulted in the catch (fish kept plus fish released) of 2,107 coho salmon, of which 85 percent (1,799) were harvested (fish kept only). Catch and harvest of rainbow trout during this period was 3,575 and 517, respectively, indicating that anglers released a majority (86 percent) of the rainbow trout they hooked. The most abundant age groups in the sport harvest were 2.1 for coho salmon and 4 and 5 for rainbow trout.

KEY WORDS: creel survey, Lake Creek, coho salmon, rainbow trout, catch, harvest, effort, population age structure.

INTRODUCTION

Effort in the sport fishery in the Lake Creek drainage (Figure 1) has grown steadily since 1977 (Figure 2). Although most of this effort appears to be directed toward chinook salmon *Oncorhynchus tshawytscha* (Hepler et al. in press), a growing sport fishery has also developed targeting the creek's stocks of coho salmon *Oncorhynchus kisutch* and rainbow trout *Oncorhynchus mykiss*. Sport harvest of coho salmon in this fishery has averaged nearly 2,000 fish since 1977 (Figure 2), whereas sport harvest of rainbow trout over this period has averaged nearly 2,500 fish (Figure 2).

The bag and possession limit governing the sport fishery for coho salmon in the Lake Creek drainage has been relaxed since 1977, increasing from three per day, three in possession during the period 1977 through 1984 to three per day, six in possession from 1985 to the present. In contrast, bag and possession regulations governing the harvests of rainbow trout in the creek have become more restrictive during this period. Regulations from 1977 through 1980 allowed the harvest of ten per day, ten in possession, only two of which could be 20 inches or more in length. In 1981 the regulations were changed to allow anglers to harvest only five per day, five in possession. In 1982, the regulations were further modified to allow only the harvest of one fish over 20 inches. In 1985, bag and possession limits were further reduced to two per day, two in possession. In 1985 and 1986, artificial lures only were allowed to be used in all of Lake Creek except the lower 2 miles where bait was allowed. In 1987, regulations were changed to allow only artificial lures from 1 September through 31 December.

These various regulatory changes were made in response to increasing public concern regarding the status of Lake Creek's coho salmon and rainbow trout stocks. However, very little quantitative baseline creel or stock data exist (other than the effort and harvest information described above from the statewide postal survey) to ascertain the effectiveness of regulatory measures. Given that continued growth in this fishery is expected, it is imperative that these data be collected.

The studies undertaken at Lake Creek are part of a larger effort to describe and evaluate the stocks of coho salmon and rainbow trout in the Susitna River drainage as a whole. Concern for the coho salmon stocks lies in a perceived over-exploitation in the commercial marine set and drift net fisheries. Data from these efforts will provide quantitative baseline biological information needed to ascertain the stock-specific harvests of Susitna River bound coho salmon in these fisheries. Concern for rainbow trout stocks was first identified in the Cook Inlet and Copper River Basin Rainbow/Steelhead Trout Management Policy (1986). Concern was raised about possible over-exploitation of rainbow trout in Upper Cook Inlet drainages, in particular the Susitna River drainage, and the loss of trophy fishing opportunities. As part of its recommendations, the plan selected several streams in Upper Cook Inlet, of which Lake Creek was one, to be protected under the proposed provisions of this plan. The plan stated the need for additional information on rainbow trout in the selected streams and the drainage as a whole. Data presented in this report are a first step toward describing the status of the coho salmon and rainbow trout stocks in Lake Creek and the Susitna River drainages.

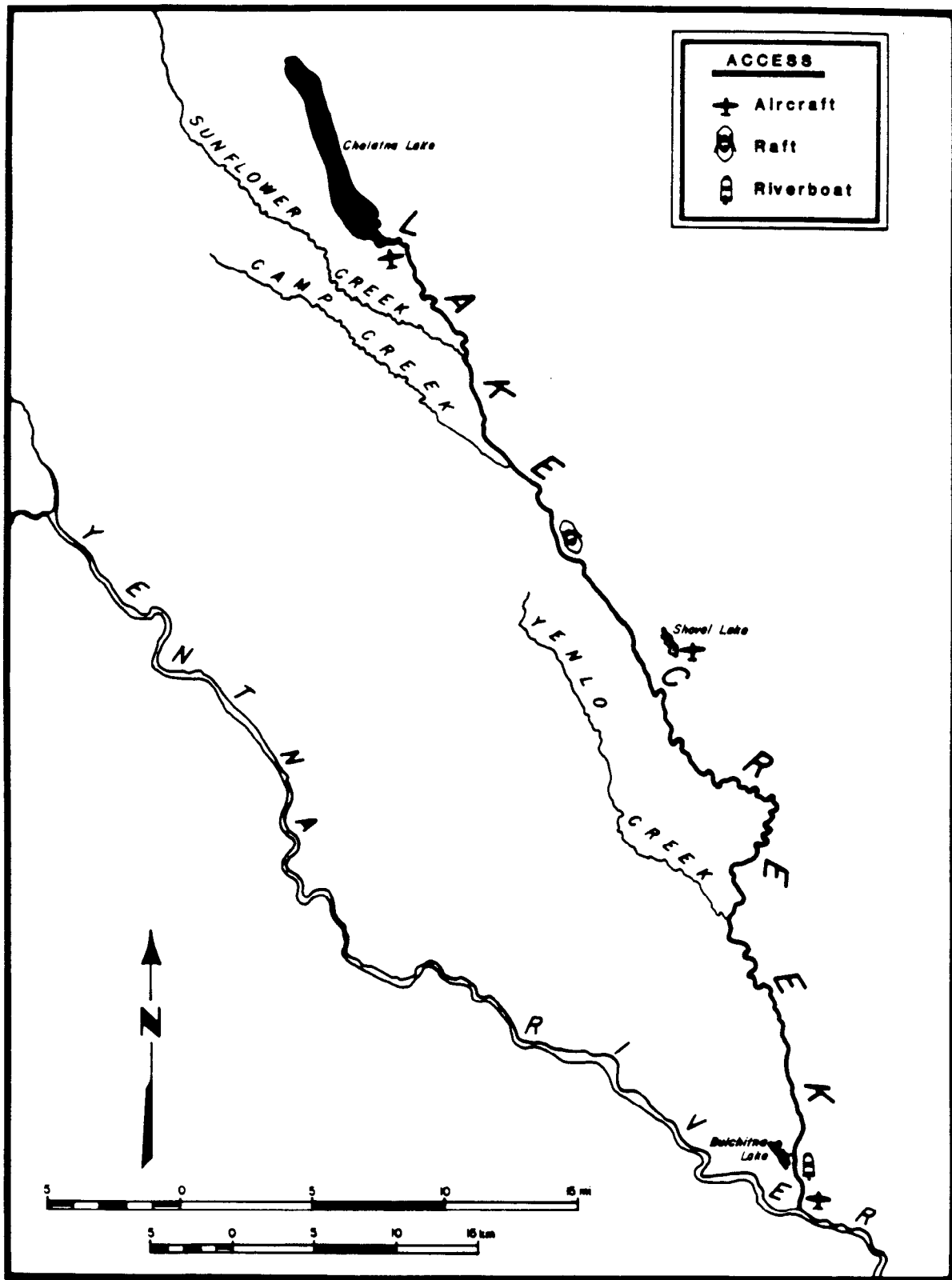


Figure 1. Map of the Lake Creek study area.

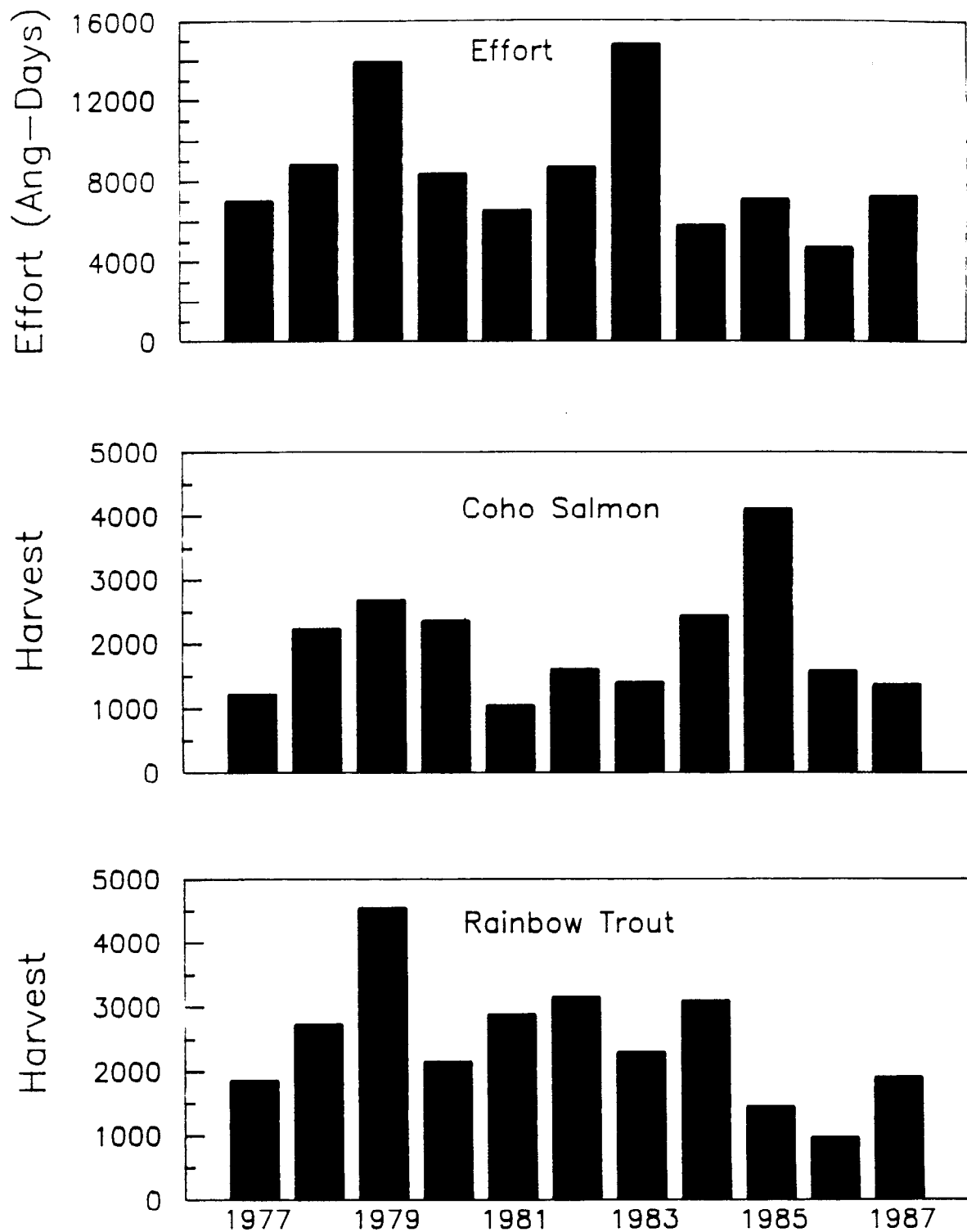


Figure 2. Sport effort and harvests of coho salmon and rainbow trout in the Lake Creek drainage during the years 1977-1987 (from Mills 1979-1988)

The objectives of this report are to present: (1) estimates of angler-effort for the sport fisheries for coho salmon and rainbow trout in the Lake Creek drainage; (2) estimates of the harvest (number of fish kept by anglers) and catch (number of fish kept plus those released by anglers) of coho salmon and rainbow trout; and (3) estimates of the sex (coho salmon only), age, and length compositions of harvested coho salmon and rainbow trout. Harvest and effort estimates for the sport fishery for chinook salmon during 1988 in Lake Creek are presented in Hepler et al. (in preparation).

METHODS

Creel Surveys

Roving creel surveys (Neuhold and Lu 1957) were conducted to estimate effort for, and catch and harvest of, coho salmon and rainbow trout by anglers in the Lake Creek drainage. The entire drainage of Lake Creek was open to fishing for coho salmon and rainbow trout from 1 January to 31 December. Physical barriers within the river, however, restricted the majority of the anglers to the lower 3.2 km (2.0 mi) of the river. Although some anglers float the upper reaches of the river, it is believed that effort and catch in the upper reaches is small in comparison to the lower reach. Thus, the survey area only included the lower 3.2 km of the stream. Primary access by anglers to this fishery is by floatplane and riverboat.

A stratified random sample design was used for angler counts on the downstream reach of Lake Creek. The fishing day was defined to be 16 hours long (0600-2200 hours). Days were stratified into four, 4-hour, sample periods (A, B, C, and D). Further stratification by weekday/weekend was not deemed necessary based on data collected during the creel survey for chinook salmon in Lake Creek (Hepler et al. in preparation). Within each week, 5 days were randomly selected, without replacement, for sampling. Periods to be sampled within each week were randomly selected, without replacement, given the constraint that only two periods could be selected per sample day. This allowed for a maximum of ten sample periods in 5 sample days per week.

Within a period selected for sampling, a starting time was randomly selected at which to conduct an angler count from the whole hours in the period (e.g., 0500, 0600). Anglers were counted while driving a riverboat the length of the survey area. It took approximately 30 minutes to conduct an angler count. A coin was tossed to determine the starting point (upstream or downstream) for beginning the angler count at the start of a selected count time. Angler counts were considered instantaneous events (Neuhold and Lu 1957).

Angler interviews were conducted during a randomly selected 2-hour block of a sample unit not used for the angler count. Interviews were conducted throughout the length of the survey area. Survey clerks recorded the following information from each angler interviewed:

1. the number of hours spent fishing;
2. the number of coho salmon and rainbow trout harvested;
3. the number of coho salmon and rainbow trout released; and
4. whether or not the angler had completed the fishing trip.

Angler effort and its variance were estimated separately for each week the fishery was surveyed. Effort was estimated as follows (Scheaffer et al. 1979):

$$\hat{E}_i = N_{i..} \bar{Y}_{i..} \quad [1]$$

Definitions of the notation for the equations defining the angler effort in the roving creel surveys are presented in Table 1. The variance of

\hat{E} was estimated by (Scheaffer et al. 1979):

$$V(\hat{E}) = N_{i..}^2 V(\bar{Y}_{i..}) \quad [2]$$

The variance of $\bar{Y}_{i..}$ is calculated as:

$$V(\bar{Y}_{i..}) = [1 - (d_i/D_i)] [s_{Bi}^2/d_i] + [1/(d_i D_i)] [\sum_{j=1}^{d_i} (s_{Wij}^2/m_{ij})] \quad [3]$$

where the between day variance (s_{Bi}^2) is estimated as:

$$s_{Bi}^2 = [\sum_{j=1}^{d_i} (\bar{Y}_{ij.} - \bar{Y}_{i..})^2] / (d_i - 1) \quad [4]$$

and the within day variance (s_{Wij}^2) is estimated as:

$$s_{Wij}^2 = [\sum_{i=1}^W \sum_{j=1}^{d_i} (y_{ij} - \bar{Y}_{ij.})^2] / (m_{ij.} - 1) \quad [5]$$

Total effort was estimated by summing the weekly estimates. Since these are considered independent estimates, the estimated variance of the total was the sum of the variances.

Rates of catch (fish kept plus those released) of coho salmon and rainbow trout were estimated using a two-stage sample design with a finite number of primary sampling units (days) and an unknown number of secondary units (anglers). Only completed-trip interviews were used to estimate catch rates. Catch rates (CPUE) were estimated for each sampled day as:

$$CPUE = \bar{c}/\bar{f} = \left[\sum_{i=1}^D \sum_{k=1}^{m_i} c_{ik} \right] / \left[\sum_{i=1}^D \sum_{k=1}^{m_i} f_{ik} \right] \quad [6]$$

Definitions of the notation for the equations defining the catch and harvest rates in the roving creel surveys are presented in Table 2. The variance of

Table 1. Definitions for the notation used in the equations for calculating angler effort in the roving creel survey.

Notation	Definition
d_i	the number of days randomly selected for conducting an angler count during a specific weekly component i .
D_i	the number of days in a specific weekly component i .
\hat{E}_i	the estimate of effort in angler-hours for a specific weekly component i .
m_{ij}	the number of angler counts conducted on day j of weekly component i .
$N_{i..}$	the number of hours of possible fishing time during a specific weekly component i .
$\bar{Y}_{i..}$	the mean angler count for a specific weekly component i .
\bar{Y}_{ij}	the mean angler count for day j of a specific weekly component i .
y_{ij}	an angler count made on day j of a specific weekly component i .

Table 2. Definitions for the notation used in the equations for calculating rates of catch and harvest and subsequent catch and harvest in the roving creel survey.

Notation	Definition
\hat{C}	the estimate of catch ¹ during a specific weekly component.
\bar{c}	the mean catch ¹ per angler by all anglers interviewed during a specific weekly component.
\bar{c}_i	the mean catch ¹ per angler by all anglers interviewed on day i during a specific weekly component.
c_{ik}	the catch ¹ by angler k interviewed on day i during a specific weekly component.
D	the number of days the fishery was open during a specific weekly component.
d	the number of days on which angler interviews were conducted during a specific weekly component.
\bar{f}	the mean number of hours fished by all anglers interviewed during a specific weekly component.
f_{ik}	the number of hours spent fishing by angler k interviewed on day i during a specific weekly component.
m_i	the number of anglers interviewed on day i during a specific weekly component.
r	the correlation between the c_{ik} and f_{ik} for anglers interviewed during a specific weekly component.
s^2	the sample variance for the mean angler count during a specific weekly component (\bar{x}).
s_c^2	the two-stage estimate of variance for the mean catch by anglers interviewed during a specific weekly component (\bar{c}).
s_f^2	the two-stage estimate of variance for the mean effort by anglers interviewed during a specific weekly component (\bar{f}).

-continued-

Table 2. Definitions for the notation used in the equations for calculating rates of catch and harvest and subsequent catch and harvest in the roving creel survey (continued).

Notation	Definition
s_i^2	the sample variance for the mean catch by anglers interviewed on day i of a specific weekly component (\bar{c}_i).

¹ Catch refers to either the catch of a single species (fish kept plus those released) or to harvest of a single species (fish kept) depending on the quantity being estimated.

CPUE was approximated using the formula for the quotient of the mean of two random variables (Jessen 1978):

$$V(\text{CPUE}) \approx [\bar{c}/\bar{f}]^2 [s_c^2/\bar{c}^2 + s_f^2/\bar{f}^2 - (2rs_c s_f/\bar{c}\bar{f})] \quad [7]$$

The two-stage variance estimate for \bar{c} was (Sukhatme et al. 1984, Von Geldern and Tomlinson 1973):

$$s_c^2 = [1 - (d/D)] s_B^2/d + [\sum_{i=1}^D (s_i^2/m_i)]/(dD) \quad [8]$$

where:

$$s_B^2 = [\sum_{i=1}^D (\bar{c}_i - \bar{c})^2]/(d-1) \quad [9]$$

The variance for \bar{f} was estimated identically as for \bar{c} by substituting the necessary quantities for effort into equations 7 and 8.

Total catch for any weekly component was estimated as:

$$\hat{C} = \hat{E} \text{ CPUE} \quad [10]$$

The variance of this estimate was calculated using the formula for the product of two independent random variables (Goodman 1960):

$$V(\hat{C}) = [\hat{E}^2 V(\text{CPUE})] + [\text{CPUE}^2 V(\hat{E})] - [V(\hat{E}) V(\text{CPUE})] \quad [11]$$

Mean harvest rates and associated variances were estimated for each weekly component following the above procedures with the exception that fish harvested by interviewed anglers were used.

Total catch and harvest were estimated by summing the estimates for all the weekly components. Since these are considered independent estimates, the estimated variance of the total was the sum of the variances.

Necessary assumptions for these analyses are:

1. angler counts made during the same day and on consecutive days are independent;
2. interviewed anglers are representative of the total angler population;
3. the number of anglers interviewed during any day is proportional to the effort on that day; and
4. no significant fishing effort occurs during the hours 2200-0600.

Age, Sex, and Length Sampling

A portion of the coho salmon and rainbow trout harvested by the sport fishery on Lake Creek was randomly sampled for age, sex, and length information. Three scales were collected on the left side of each fish approximately two rows above the lateral line and on the diagonal row downward from the posterior insertion of the dorsal fin as described in Clutter and Whitesel (1956). Scales from coho salmon were mounted on adhesive-coated cards and impressions were made in cellulose acetate. Scales from rainbow trout were mounted on glass slides. Age determinations were made by examination of scales using a microfiche reader. Ages of coho salmon were designated using the European method (Koo 1962) where the first number refers to the number of years of freshwater residence after emergence and the second number refers to the number of years of marine residence. Ages of rainbow trout were designated as total freshwater age. Lengths of coho salmon were measured from the middle of the eye to fork of the tail to the nearest 5 mm. Lengths of rainbow trout were measured from the tip of the snout to the fork of the tail to the nearest 1 mm.

The proportional age composition of the sampled portion of the sport harvest was estimated for each fishery. Letting p_h equal the estimated proportion of age group h in the sample, the variance of p_h was estimated using the normal approximation to the binomial (Scheaffer et al. 1979):

$$V(\hat{p}_h) = \hat{p}_h(1-\hat{p}_h)/(n_T-1), \quad [12]$$

where n_T is the total number of legible scales collected from coho salmon or rainbow trout during the fishery.

To derive the estimated number of coho salmon or rainbow trout harvested by age group in the fishery, the total number of coho salmon or rainbow trout

harvested was multiplied by \hat{p}_h . The variance of this estimate was calculated using Goodman's (1960) formula.

Mean length at age by sex and its variance were estimated using standard normal procedures.

RESULTS

Creel Estimates

The creel survey of the Lake Creek sport fishery for coho salmon and rainbow trout was conducted from 4 August through 11 September 1988.

Sport Effort:

Counts of anglers during the survey period ranged from 0 to 77 (Appendix Table 1). Estimated angler-effort during the survey was 11,117 angler-hours (Table 3). Effort peaked during the second weekly period (8 August through 14 August) when catch and harvest rates for coho salmon peaked (Table 4).

Table 3. Estimated number of angler-hours of effort during each weekly strata of the sport fishery in Lake Creek during 1988.

Time Frame	Strata	Effort (Angler-hours)		
		Total	SE ¹	RP ²
Week 1	8/04-8/07	2,933	673.5	45.0%
Week 2	8/08-8/14	3,438	573.9	32.7%
Week 3	8/15-8/21	2,027	322.4	31.2%
Week 4	8/22-8/28	933	207.9	43.7%
Week 5	8/29-9/04	834	285.0	67.0%
Week 6	9/05-9/11	952	196.5	40.5%
Total	8/04-9/11	11,117	1,024.7	18.1%

¹ Standard Error

² Relative Precision, $\alpha = 0.05$.

Table 4. Estimated harvest and catch rates of coho salmon during each weekly strata of the sport fishery in Lake Creek during 1988.

Time Frame	Strata	Harvest Rate			Catch Rate		
		Mean	SE ¹	RP ²	Mean	SE ¹	RP ²
Week 1	8/04-8/07	0.176	0.0301	33.5%	0.201	0.0370	36.1%
Week 2	8/08-8/14	0.217	0.0416	37.6%	0.255	0.0488	37.5%
Week 3	8/15-8/21	0.117	0.0189	31.7%	0.139	0.0251	35.4%
Week 4	8/22-8/28	0.201	0.0335	32.7%	0.264	0.0435	32.3%
Week 5	8/29-9/04	0.135	0.1222	177.4%	0.135	0.1222	177.4%
Week 6	9/05-9/11	0.000	0.0000	--	0.000	0.0000	--

¹ Standard Error

² Relative Precision ($\alpha = 0.05$)

Harvest Rates and Catch Rates:

Daily catch and harvest rates of coho salmon ranged from 0.000 to 0.750 and 0.000 to 0.750 fish per hour, respectively (Appendix Table 2). As with effort, catch and harvest rates of coho salmon peaked during the second weekly period (8 August through 14 August; Table 4). Daily catch and harvest rates of rainbow trout ranged from 0.000 to 2.159 and 0.000 to 0.556 fish per hour, respectively (Appendix Table 3). In contrast with coho salmon, catch and harvest rates for rainbow trout peaked during the fifth weekly period (29 August through 4 September; Table 5).

Harvest and Catch:

The estimated catch of coho salmon was 2,107 fish, of which 85% (1,799) were harvested (kept) by anglers (Table 6). The estimated catch of rainbow trout was 3,575 fish, of which only 14% (517) were harvested (kept) by anglers (Table 7), indicating that anglers release a majority of the rainbow trout they hook.

Age, Sex, and Length Statistics

Age 2.1 coho salmon were predominant in the sport harvest of the Lake Creek fishery (Table 8). Mean lengths of harvested coho salmon by sex and age group for the sampled harvests are summarized in Table 9. Rainbow trout aged 4 and 5 were predominant in the sport harvest of the Lake Creek fishery (Table 10). Mean lengths of harvested rainbow trout increased by age group (Table 11).

DISCUSSION

The estimated harvest of coho salmon and rainbow trout during 1988 was 1,799 and 517, respectively. For coho salmon, only about 15% of the fish that were caught were released. In contrast, about 85% of the rainbow trout that were caught were released, suggesting that the fishery for rainbow trout in the creek is primarily a catch and release fishery. The predominant ages of coho salmon and rainbow trout in the sport harvests were age 2.1 and ages 4 and 5, respectively.

These data are a first step toward describing the status of the Lake Creek coho salmon and rainbow trout stocks. However, additional data are required to ascertain the stock-specific structures of Lake Creek's coho salmon and rainbow trout populations. This information is needed to determine sustainable or optimal yields (i.e., trophy in the case of rainbow trout). For coho salmon, data needed to build brood tables necessary for estimation of sustainable yield include escapement estimates and marine exploitation by age class. For rainbow trout, data needed to estimate population survival and recruitment include migratory behavior and in-river abundance by age class over several years. This information is needed to estimate sustainable and optimal yield of Lake Creek's rainbow trout stocks.

Table 5. Estimated harvest and catch rates of rainbow trout during each weekly strata of the sport fishery in Lake Creek during 1988.

Time Frame	Strata	Harvest Rate			Catch Rate		
		Mean	SE ¹	RP ²	Mean	SE ¹	RP ²
Week 1	8/04-8/07	0.011	0.0046	82.0%	0.036	0.0110	59.9%
Week 2	8/08-8/14	0.046	0.0103	43.9%	0.231	0.0428	36.3%
Week 3	8/15-8/21	0.026	0.0080	60.3%	0.456	0.1010	43.4%
Week 4	8/22-8/28	0.119	0.0525	86.5%	0.633	0.2837	87.8%
Week 5	8/29-9/04	0.196	0.0754	75.4%	0.947	0.1954	40.4%
Week 6	9/05-9/11	0.000	0.0000	--	0.389	0.1176	59.3%

¹ Standard Error

² Relative Precision ($\alpha = 0.05$)

Table 6. Estimated number of coho salmon harvested and caught during each weekly strata of the sport fishery in Lake Creek during 1988.

Time Frame	Strata	Harvest			Catch		
		Total	SE ¹	RP ²	Total	SE ¹	RP ²
Week 1	8/04-8/07	516	146.4	55.6%	589	171.6	57.1%
Week 2	8/08-8/14	746	188.2	49.5%	876	220.8	49.4%
Week 3	8/15-8/21	236	53.3	44.3%	282	67.4	46.8%
Week 4	8/22-8/28	188	51.7	53.9%	247	67.7	53.7%
Week 5	8/29-9/04	113	103.2	179.1%	113	103.2	179.1%
Week 6	9/05-9/11	0	0.0	--	0	0.0	--
Total		1,799	270.3	29.4%	2,107	313.0	29.1%

¹ Standard Error

² Relative Precision ($\alpha = 0.05$)

Table 7. Estimated number of rainbow trout harvested and caught during each weekly strata of the sport fishery in Lake Creek during 1988.

Time Frame	Strata	Harvest			Catch		
		Total	SE ¹	RP ²	Total	SE ¹	RP ²
Week 1	8/04-8/07	33	15.0	89.2%	105	39.6	73.9%
Week 2	8/08-8/14	157	43.7	54.5%	795	196.5	48.4%
Week 3	8/15-8/21	53	18.1	66.8%	924	250.0	53.0%
Week 4	8/22-8/28	111	53.8	94.9%	591	289.7	96.1%
Week 5	8/29-9/04	163	81.2	97.7%	790	310.4	77.0%
Week 6	9/05-9/11	0	0.0	--	370	133.6	70.8%
Total		517	109.3	41.1%	3,575	584.4	30.1%

¹ Standard Error

² Relative Precision ($\alpha = 0.05$)

Table 8. Estimated sex and age composition of coho salmon
in the sport harvest from Lake Creek during 1988.

Sex		Age Group			
		1.1	2.1	3.1	4.0
Males	Percent	9.5	36.2	5.2	0.9
	Number	172	652	94	16
	Standard Error	12.5	41.2	7.7	2.4
Females	Percent	11.1	35.1	2.0	
	Number	199	632	35	
	Standard Error	14.2	40.0	3.9	
Combined (n=461) ¹	Percent	20.6	71.3	7.2	0.9
	Number	371	1,284	129	16
	Standard Error	24.1	78.7	9.9	2.4

¹ Sample Size ($\alpha = 0.05$)

Table 9. Mean length (mid-eye to fork-of-tail) in millimeters by sex and age group of coho salmon sampled from the sport harvest in Lake Creek during 1988.

Age Group	Sample Size	Mean Length	SE ¹	Min. Length	Max. Length
<u>Males (n = 239)²</u>					
4.0	4	353.8	13.8	330	390
1.1	44	560.0	7.1	425	620
2.1	167	573.8	3.8	290	640
3.1	24	573.4	18.7	335	645
<u>Females (n = 222)²</u>					
1.1	51	560.7	4.0	490	620
2.1	162	567.2	2.2	475	630
3.1	9	573.9	9.4	525	615
<u>Combined (n = 461)²</u>					
4.0	4	353.8	13.8	330	390
1.1	95	560.4	3.9	425	620
2.1	329	570.5	2.2	290	640
3.1	33	573.5	13.8	335	645

¹ Standard Error

² Sample Size

Table 10. Estimated age composition of rainbow trout in the sport harvest from Lake Creek during 1988.

Age Group	Percent	Number	Standard Error
2	1.25	6	6.5
3	21.25	110	32.9
4	35.00	181	46.9
5	37.50	194	49.4
6	5.00	26	13.5
<hr/> Total	<hr/> 100.00 (n=80) ¹	<hr/> 517	

¹ Sample Size

Table 11. Mean total length in millimeters by age group of rainbow trout sampled from the sport harvest in Lake Creek during 1988.

Age Group	Sample Size	Mean Length	SE ¹	Min. Length	Max. Length
2	1	202.0	0.0	202	202
3	17	316.4	8.4	256	377
4	28	390.4	9.2	313	475
5	30	418.3	8.1	319	509
6	4	452.0	12.7	414	466

¹ Standard Error

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APPENDIX

Appendix Table 1. Angler counts during the sport fishery for coho salmon and rainbow trout in Lake Creek during 1988.

Date	PERIOD			
	A	B	C	D
04-Aug		65	42	
05-Aug OFF				
06-Aug		77		12
07-Aug	30		49	
08-Aug OFF				
09-Aug OFF				
10-Aug		45		17
11-Aug	18	28		
12-Aug	2			25
13-Aug			53	24
14-Aug	45	50		
15-Aug OFF				
16-Aug OFF				
17-Aug	20	33		
18-Aug		25	22	
19-Aug			17	4
20-Aug	7			17
21-Aug			27	9
22-Aug OFF				
23-Aug OFF				
24-Aug		17		4
25-Aug	9		9	
26-Aug		2		0
27-Aug	8		13	
28-Aug	13			
29-Aug				1
30-Aug	10	5		
31-Aug	0	3		
01-Sep OFF				
02-Sep OFF				
03-Sep			10	17
04-Sep			21	0
05-Sep	8	6		
06-Sep OFF				
07-Sep OFF				
08-Sep	15		15	
09-Sep		5	3	
10-Sep			17	0
11-Sep	7	9		

Appendix Table 2. Daily summary statistics for effort and coho salmon harvest and catch by completed-trip anglers interviewed during the sport fishery for coho salmon and rainbow trout in Lake Creek during 1988.

Date	Sample Size	EFFORT (hrs)		HARVEST			CATCH		
		Mean	SE ¹	Mean	SE ¹	CPUE	Mean	SE ¹	CPUE
804	48	5.3	0.36	1.52	0.184	0.288	1.60	0.208	0.304
806	36	6.5	0.55	0.86	0.170	0.132	1.28	0.362	0.197
807	64	5.0	0.37	0.59	0.101	0.119	0.61	0.106	0.122
810	95	4.4	0.26	1.35	0.134	0.305	1.66	0.188	0.377
811	29	4.9	0.34	1.38	0.213	0.280	1.41	0.208	0.287
812	22	3.5	0.39	0.27	0.117	0.078	0.32	0.121	0.091
813	32	2.9	0.29	0.16	0.079	0.053	0.16	0.079	0.053
814	30	4.0	0.42	0.20	0.074	0.050	0.20	0.074	0.050
817	24	5.6	0.48	0.42	0.146	0.075	0.42	0.146	0.075
818	28	4.0	0.49	0.50	0.121	0.124	0.89	0.323	0.222
819	35	3.6	0.42	0.80	0.200	0.224	0.83	0.199	0.232
820	28	4.1	0.44	0.29	0.124	0.069	0.29	0.124	0.069
821	21	4.2	0.51	0.33	0.159	0.080	0.38	0.161	0.091
822	26	2.4	0.30	0.65	0.228	0.272	1.04	0.424	0.432
824	24	4.0	0.55	1.17	0.280	0.292	1.29	0.327	0.323
825	3	5.0	1.00	0.67	0.333	0.133	0.67	0.333	0.133
826	14	3.6	0.54	0.07	0.071	0.020	0.07	0.071	0.020
827	10	4.4	0.37	0.60	0.267	0.136	1.00	0.298	0.227
829	7	4.9	0.40	0.00	0.000	0.000	0.00	0.000	0.000
830	4	3.0	0.00	2.25	0.750	0.750	2.25	0.750	0.750
903	6	1.9	0.27	0.00	0.000	0.000	0.00	0.000	0.000
904	3	3.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000
905	5	4.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000
908	6	1.7	0.42	0.00	0.000	0.000	0.00	0.000	0.000
909	5	4.8	0.73	0.00	0.000	0.000	0.00	0.000	0.000

¹ Standard Error

Appendix Table 3. Daily summary statistics for effort and rainbow trout harvest and catch by completed-trip anglers interviewed during the sport fishery for coho salmon and rainbow trout in Lake Creek during 1988.

Date	Sample Size	EFFORT (hrs)		HARVEST			CATCH		
		Mean	SE ¹	Mean	SE ¹	CPUE	Mean	SE ¹	CPUE
804	48	5.3	0.36	0.08	0.050	0.016	0.17	0.086	0.032
806	36	6.5	0.55	0.00	0.000	0.000	0.03	0.028	0.004
807	64	5.0	0.37	0.08	0.046	0.016	0.31	0.099	0.063
810	95	4.4	0.26	0.28	0.059	0.064	1.47	0.287	0.334
811	29	4.9	0.34	0.07	0.048	0.014	0.62	0.287	0.126
812	22	3.5	0.39	0.00	0.000	0.000	0.09	0.063	0.026
813	32	2.9	0.29	0.06	0.043	0.021	0.22	0.189	0.074
814	30	4.0	0.42	0.27	0.106	0.067	1.00	0.296	0.252
817	24	5.6	0.48	0.17	0.078	0.030	2.13	1.020	0.382
818	28	4.0	0.49	0.00	0.000	0.000	1.68	0.800	0.418
819	35	3.6	0.42	0.20	0.090	0.056	3.14	1.334	0.878
820	28	4.1	0.44	0.11	0.079	0.026	0.86	0.514	0.208
821	21	4.2	0.51	0.05	0.048	0.011	1.43	1.281	0.341
822	26	2.4	0.30	0.00	0.000	0.000	0.77	0.361	0.320
824	24	4.0	0.55	0.33	0.143	0.083	1.21	0.318	0.302
825	3	5.0	1.00	1.33	0.667	0.267	3.00	1.528	0.600
826	14	3.6	0.54	0.86	0.254	0.235	1.21	0.214	0.333
827	10	4.4	0.37	0.80	0.291	0.182	9.50	1.939	2.159
829	7	4.9	0.40	0.71	0.360	0.147	5.00	1.155	1.029
830	4	3.0	0.00	0.75	0.250	0.250	4.50	1.500	1.500
903	6	1.9	0.27	0.00	0.000	0.000	0.00	0.000	0.000
904	3	3.0	0.00	1.67	0.333	0.556	3.33	0.333	1.111
905	5	4.0	0.00	0.00	0.000	0.000	0.60	0.245	0.150
908	6	1.7	0.42	0.00	0.000	0.000	1.33	0.843	0.800
909	5	4.8	0.73	0.00	0.000	0.000	2.00	1.225	0.417

¹ Standard Error

